

Application No. 10/720,650
Amendment dated November 9, 2005
After Final Office Action of May 25, 2005

Docket No.: BA1-03-1495 (03-1495)

REMARKS

Claims 1-44 were pending when an Office Action was mailed on May 25, 2005. Claims 1-44 were rejected. The Office Action was made Final.

This Response is submitted concurrent with filing of a Request for Continued Examination. In view of the remarks and arguments set forth herein, Applicants respectfully submit that all claims pending in this patent application are in condition for allowance. Applicants very respectfully request entry of this Response, and reconsideration and allowance of all claims.

I. CLAIM REJECTIONS – 35 USC § 102

A. CLAIM REJECTIONS – 35 USC § 102(B)

Claims 1-2, 4, 9-10, and 31-33 were finally rejected under 35 USC § 102(b) as being anticipated by U.S. patent no. 4,765,749 to Bourgade et al. ("Bourgade"). The Office Action stated that Bourgade discloses in Figure 2 an IR calorimeter 20 comprising a body (absorbing element) 2, a temperature sensor (thermopile/plurality of thermopiles/plurality of thermocouples) 10 attached over a substantial portion of the body 2, the temperature sensor 10 is configured to sense a temperature change in a substantial portion of the body 2 responsive to absorption of captured radiation, a non-aqueous cooling system (heat sink) 12 configured to cool the body 2 from the temperature excessively elevated as a result of absorption of the captured radiation. The Office Action stated that wires 14 and 16 lead to a processing device which processes signals from the thermopile 10 and a resistance wire 8 (which was stated to be attached/part of the temperature sensor 10) respectively to, inherently, convert the thermopile signals in temperature and to apply energy to the resistance 8.

Applicants very respectfully traverse.

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1. THE BOURGADE ET AL. REFERENCE

Bourgade discloses a quasi-adiabatic calorimeter for measuring the energy transported by radiation. It is an object of Bourgade to provide "a calorimeter having a great sensitivity and easily reproducible calibration making it possible to simulate in an almost perfect manner an energy deposit in the absorbing element." Bourgade, column 1, lines 56-59.

Bourgade teaches that such great sensitivity is achieved by *minimizing* the amount of surface of the absorbing element occupied by the *measuring means* of the thermopile and that such easily-reproducible calibration is achieved by *maximizing* the surface of the absorbing element occupied by the *resistive deposit*. Details that explain Bourgade's teachings will be provided below directly from the Bourgade reference.

The Bourgade invention "relates to a calorimeter [20] for measuring the energy transmitted by radiation comprising in known manner an absorbing element [2] able to absorb said radiation and having an outer face [3] exposed to the radiation and an inner face [9], said element [2] undergoing a temperature increase during interaction with said radiation, means [10] for measuring the temperature increase, said measuring means [10] using part of the surface of the inner face [9] of the absorbing element [2] and a calibration resistance or resistor [8] on the inner face [9] of the absorbing element [2]." *Id.*, column 1, line 60 – column 2, line 2 (reference numbers supplied).

"The calibration resistance is in the form of a resistive material coating deposited on that part of the surface of the inner face of the absorbing element not used by the measuring means, said coating being in direct contact with said inner face of the absorbing element over at least 50% of the surface thereof." *Id.*, column 2, lines 3-9.

"Preferably the *resistive deposit or coating is in direct contact with the inner face of the absorbing element over at least 70% of the surface thereof* and in the calorimeters which have been produced the resistive deposit covers approximately 80% of said surface." *Id.*, column 2,

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lines 10-14 (emphasis supplied). Referring to FIG. 3 of Bourgade, "resistance 8 covers in the form of a homogeneous, continuous strip approximately 80% of the surface of inner face 9 of the second coating 6." *Id.*, column 5, lines 19-22. "The calorimeter is calibrated by electric heating of resistance 8, which simulates by the Joule effect an energy deposit in absorbing element 2. *The greater the surface of inner face 9 of the second coating 6 covered by resistance 8 and the smaller its thickness, the more the simulation approaches the absorbing element-radiation interaction.*" *Id.*, column 5, lines 33-39 (emphasis supplied).

The "means for measuring the temperature increase of the absorbing element comprise at least one thermopile having a measuring face in contact with the inner face of the absorbing element and a reference face, said *thermopile occupying at the most 20% of the surface of the inner face of the absorbing element...*" *Id.*, column 2, lines 23-28 (emphasis supplied). "As shown in FIG. 2, thermopile 10 has a measuring face 11 in contact with the inner face 9 of the second coating 6 and a reference face 13. Preferably, *thermopile 10 occupies at the most 20% of the surface of inner face 9 of second coating 6.*" *Id.*, column 6, lines 1-5 (emphasis supplied).

Referring to FIG. 3 of Bourgade, "[t]he thermopile 10...occupies the central part of inner face 9 of the second coating 6, which is not occupied by the resistive deposit 8." *Id.*, column 5, lines 26-29. Moreover, "[t]he use of a thermopile instead of a simple thermocouple has the advantage of providing a much greater sensitivity." *Id.*, column 6, lines 12-14.

"The calorimeter...can have a plurality of thermopiles, each having a measuring face and a reference face, the latter being in contact with the inner face of the absorbing element, *all the thermopiles covering at the most 20% of the inner surface of the absorbing element.*" Column 2, line 66 – column 3, line 3 (emphasis supplied). "FIG. 4 shows how it is possible to place several thermopiles 10 on the inner face 9 of absorbing element 2, *the thermopiles* being regularly distributed and *covering at the most 20% of the surface of face 9.* The *calibration resistive deposit 8* is preferably in the form of one or more homogeneous continuous strips placed between thermopiles 10 so as to *cover the maximum of the surface not occupied by the piles.*" *Id.*, column 6, lines 40-47 (emphasis supplied).

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Bourgade summarizes salient points as follows:

The calorimeter according to the invention has several advantages, the most important of which is that calibration is reliable and easily reproducible making it possible to simulate almost perfectly an energy deposit in the absorbing element. As was stated hereinbefore, this is due to the fact that the calibration resistance is in contact with the inner face of the absorbing element over a large part of the inner face thereof and in a zone not occupied by the thermopile. Thus, the heat given off in the resistance is rapidly transmitted into the absorbing element and heats the mass thereof before reaching the thermopile. Thus, the effect is the same as when the outer face of the absorbing element is struck by radiation for an equal deposited energy...Moreover, as this resistance is a coating deposited on the inner face of the absorbing element, it is in direct contact, i.e. in excellent thermal contact, with a major part of the surface of said inner face... *Id.*, column 9, lines 43-63 (emphasis supplied).

Thus, in summary, Bourgade teaches that in a calorimeter:

- the thermopile (or all of a plurality of thermopiles) occupies at the most 20% of the surface of the inner face of the absorbing element;
- use of a thermopile instead of a simple thermocouple has the advantage of providing a much greater sensitivity;
- resistance covers in the form of a homogeneous, continuous strip approximately 80% of the surface of inner face 9 of the second coating;
- the thermopile 10 occupies the central part of inner face 9 of the second coating 6, which is not occupied by the resistive deposit 8; and
- calibration is reliable and easily reproducible making it possible to simulate almost perfectly an energy deposit in the absorbing element due to the fact that the calibration resistance is

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in contact with the inner face of the absorbing element over a large part of the inner face thereof and in a zone not occupied by the thermopile.

Thus, Applicants very respectfully submit that some teachings of Bourgade may have been misconstrued. For example, contrary to the characterization set forth in the Office Action, Applicants very respectfully submit that the temperature sensor 10 is not a thermopile/plurality of thermopiles/plurality of thermocouples attached over a substantial portion of the body 2. Instead, as described in detail above in the very words of Bourgade, the temperature sensor of Bourgade is a thermopile or plurality of thermopiles -- but not a thermocouple or plurality of thermocouples -- that occupies at the most 20% of the surface of the inner face of the absorbing element.

Also, contrary to the characterization set forth in the Office Action, Applicants very respectfully submit that the resistance wire 8 is not attached/part of the temperature sensor 10. Instead, as described in detail above in the very words of Bourgade and as shown in FIG. 3 of Bourgade, the thermopile 10 occupies the central part of inner face 9 of the second coating 6, which is not occupied by the resistive deposit 8. This enables, according to Bourgade, calibration to be reliable and easily reproducible, thereby making it possible to simulate almost perfectly an energy deposit in the absorbing element due to the fact that the calibration resistance is in contact with the inner face of the absorbing element over a large part of the inner face thereof and in a zone not occupied by the thermopile. Thus, Applicants very respectfully submit that, contrary to the characterization set forth in the Office Action, the resistance wire 8 is neither attached to nor is part of the temperature sensor (that is, thermopile) 10.

2. CLAIMS 1-2, 4, 9-10, AND 31-33 ARE NOT ANTICIPATED BY BOURGADE

Applicants very respectfully submit that Claims 1-2, 4, 9-10, and 31-33 are not anticipated by Bourgade.

As discussed above in detail and in the words of Bourgade, Bourgade discloses that in a calorimeter a thermopile or all of a plurality of thermopiles -- but not a thermocouple or a plurality

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of thermocouples -- occupies at the most 20% of the surface of the inner face of the absorbing element. Such a minimizing of the surface of the body occupied by the thermopile permits a separate resistance deposit to cover approximately 80% of the surface of the inner face of the absorbing element. As such, the thermopile occupies the central part of inner face of the absorber element which is not occupied by the resistive deposit. Thus, the resistance wire is not attached/part of the temperature sensor (that is, thermopile). Minimizing the surface of the absorbing element occupied by the thermopile (to no more than 20%) and maximizing the surface of the absorbing element occupied by the resistance deposit (to up to 80%) enables calibration to be reliable and easily reproducible, thereby making it possible to simulate almost perfectly an energy deposit in the absorbing element. This is due to the fact that the calibration resistance is in contact with the inner face of the absorbing element over a large part of the inner face thereof (again, up to 80%) and in a zone (again, no more than 20%) not occupied by the thermopile.

To the contrary, Claim 1 recites "a temperature sensor attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the temperature sensor being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation". Similarly, Claim 31 recites "detecting a change in temperature of the body with wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation".

Because Bourgade emphasizes that a thermopile or all of a plurality of thermopiles occupies at the most 20% of the surface of the inner face of the absorbing element, Applicants respectfully submit that Bourgade does not teach or suggest (and instead teaches away from) "a temperature sensor attached over a substantial portion of the body in thermal communication with a substantial portion of the body" as recited in Claim 1 or "wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body" as recited in Claim 31.

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Because Bourgade does not teach or suggest all of the claim limitations of Claims 1 and 31, Applicants very respectfully submit that Claims 1 and 31 are not anticipated by Bourgade and are in condition for allowance. Applicants respectfully request entry of the Amendment, and reconsideration and allowance of Claims 1 and 31.

Claims 2, 4, and 9-10 depend from Claim 1, and Claims 32-33 depend from Claim 31. Because of their dependency and for other reasons, Applicants respectfully submit that Claims 2, 4, 9-10, and 32-33 are also not anticipated by Bourgade and are in condition for allowance. Applicants respectfully request reconsideration and allowance of Claims 2, 4, 9-10, and 32-33.

II. CLAIM REJECTIONS -- 35 USC § 103

A. CLAIMS 1-2, 4, 6-8, 10, 15-17, 19, 24, 25, 31-33, AND 37-39

Claims 1-2, 4, 6-8, 10, 15-17, 19, 24, 25, 31-33, and 37-39 were finally rejected under 35 USC § 103(a) as being unpatentable over U.S. Patent No. 4,687,342 to Betzler et al. ("Betzler"). The Office Action stated that Betzler discloses in Figures 1, 2, and 13 a device in the field of Applicants' endeavor comprising an absorbing body 3, a resistor layer 4 (as a part of the Wheatstone bridge) attached over a substantial portion of the body 3 in thermal communication (through the metal carrier foil 1) with the body 3 and being configured to detect a change in temperature of the substantial portion of the body responsive to an IR absorbed/captured by the body. The Office Action also stated that the device comprises a detector (Wheatstone) configured to detect the resistance of the resistor 4 and a processing device (radiation measuring device/multimeter) 10 having a (first) component, inherently, configured to measure the radiation/temperature corresponding to the resistance of the resistor 4 (citing column 6, lines 52-68). The Office Action further stated that the device further comprises a dissipater (non-aqueous heat sink/cooling device) 11. The Office Action stated that, as shown in Figure 13, the power deriving from the temperature change and resulting measurable resistance change of the resistance change of the resistor would imply that the processing device comprises another (second) component to derive the power corresponding to the admitted/absorbed radiation.

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Applicants very respectfully traverse.

1. THE BETZLER ET AL. REFERENCE

Betzler discloses a thermal radiation measuring system -- a bolometer -- with a radiation measuring device and a shielded reference device. Betzler is concerned with overcoming disadvantages of detectors with large configurations, including screen effects of geometrical optics caused by dimensions of the detector surface with respect to the distance of the detector from the object to be measured and its dimensions. *See* Betzler, column 2, lines 1-7. To that end, Betzler states that Betzler's "invention is directed to the problem of developing the radiation measuring device in such a way that it meets the following criteria: (a) small dimensions of the detector and consequently...(c) negligible screen effects of the geometrical optics..." *Id.*, column 2, lines 27-34.

Referring to Figure 1 of Betzler, a carrier foil 1 is made of an electrically insulating material. Onto the carrier foil 1 a thermally conductive layer 2 is vacuum metallized. In the center of this thermally conductive layer 2 an absorber layer 3 made of the same material as the thermally conductive layer 2 is vacuum metallized. The absorber layer 3 establishes a measuring surface. The thermally conductive layer 2 and absorber layer 3 may also be of one piece construction. Opposite the absorber layer 3 on the other side of the carrier foil 1 there is a high-value resistor layer 4. *See Id.*, column 6, lines 30-51.

Referring additionally to Figure 2 of Betzler, a resistor M formed by the resistor layer 4 is located in an arm 5 of a Wheatstone bridge 6, which also has three further resistors 7, 8, and 9, of which the resistor 9 may be a resistor layer R of a reference measuring device. Touching thermally conductive layer 2 near its edges, a dissipater 11 is placed upon the arrangement. The dissipater 11 has inwardly extending projections 12 which form a shield leaving free only the access to the absorber layer 3 which is exposed to radiation F. The carrier foil 1 forms together with the thermally conductive layer 2, the absorber layer 3 and the resistor layer 4, to become the detector of the radiation measuring device, which may also be termed a foil bolometer. *See Id.*, column 6, lines 52-68.

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Betzler explains that "[t]he absorber layer is exposed to the radiation to be measured. The radiation absorbed in the absorber layer leads to the absorber layer being heated. The heat dissipates in the direction of the high-value resistor layer and the sides. The high-value resistor layer changes its resistance value measurably; the higher its value, the more apparent the change...The change in the resistance of the resistor layer on the side of the carrier foil opposite the absorber layer is a measure of the temperature change averaged over the surface of the resistor or absorber layer." *Id.*, column 10, lines 38-53.

Betzler explains the importance of shortening the time constant – which is done by minimizing the length and/or width of the detector. Referring to Figure 13, Betzler emphasizes that *"[i]t is, therefore, essential to design the bolometer detector structurally in such a way that the heat flow from the absorber side through the thin carrier foil to the resistor layer takes place in a much shorter time than the lateral dissipation of heat from the absorber layer to the dissipater...The dissipation of heat may be affected structurally by enlarging or reducing the thickness of the absorber layer, as well as by enlarging or reducing its length and/or width. With a given thickness, a corresponding enlargement of the length and/or width results in an enlargement of the time constant...With reference to FIG. 15, it can be seen that for the short time to the temperature difference θ_0 of the absorber layer, for the detector with a large time constant (B), to that with a small time constant (A) is virtually identical. However, for long time periods t the temperature change θ_A is smaller than in case (B). The higher sensitivity can thus only be exploited for longer time periods...Furthermore, a further increase in the time constant leads to a restriction of the dynamics with respect to the radiated power to be measured and the inherent radiation of the absorber layer is no longer completely negligible due to the higher detector temperature."* *Id.*, column 11, lines 15-53 (emphasis supplied).

Thus, Betzler is directed to a radiation measuring device that includes criteria of small dimensions of the detector. In support of this objective, Betzler teaches that it is essential to design the bolometer detector structurally in such a way that the heat flow from the absorber side through the thin carrier foil to the resistor layer takes place in a much shorter time than the lateral dissipation of heat from the absorber layer to the dissipater. With a given thickness, a corresponding

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enlargement of the length and/or width results in an enlargement of the time constant. Conversely, with a given thickness, a corresponding decrease of the length and/or width results in a decrease of the time constant – which results in heat flow from the absorber side through the thin carrier foil to the resistor layer taking place in a much shorter time than the lateral dissipation of heat from the absorber layer to the dissipater.

2. CLAIMS 1-2, 4, 6-8, 10, 15-17, 19, 24, 25, 31-33, AND 37-39 ARE PATENTABLE OVER BETZLER BECAUSE BETZLER DOES NOT SUGGEST (AND TEACHES AWAY FROM) THE CLAIMED INVENTION AND THEREFORE A *PRIMA FACIE* CASE OF OBVIOUSNESS HAS NOT BEEN ESTABLISHED

a. A *PRIMA FACIE* CASE OF OBVIOUSNESS HAS NOT BEEN ESTABLISHED BECAUSE BETZLER DOES NOT TEACH OR SUGGEST THE CLAIMED INVENTION

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because Betzler does not teach or suggest the claimed invention.

As discussed above, Betzler teaches that a radiation measuring device includes criteria of small dimensions of the detector. In support of this objective, Betzler teaches that it is essential to design the bolometer detector structurally in such a way that the heat flow from the absorber side through the thin carrier foil to the resistor layer takes place in a much shorter time than the lateral dissipation of heat from the absorber layer to the dissipater. With a given thickness, a corresponding enlargement of the length and/or width results in an enlargement of the time constant. Conversely, with a given thickness, a corresponding decrease of the length and/or width results in a decrease of the time constant – which results in heat flow from the absorber side through the thin carrier foil to the resistor layer taking place in a much shorter time than the lateral dissipation of heat from the absorber layer to the dissipater.

To the contrary, Claim 1 recites “a temperature sensor attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the temperature sensor

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being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation"; Claim 15 recites "a wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation"; and Claim 31 recites "detecting a change in temperature of the body with wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation".

Thus, Applicants respectfully submit that Betzler does not teach or suggest "a temperature sensor attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the temperature sensor being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation" as recited in Claim 1; "a wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation" as recited in Claim 15; or "detecting a change in temperature of the body with wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation" as recited in Claim 31.

Because Betzler does not teach or suggest the claimed invention, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, and that Claims 1, 15, and 31 are patentable over Betzler and are in condition for allowance. Applicants respectfully request reconsideration and allowance of Claims 1, 15, and 31.

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Claims 2, 4, 6-8, and 10 depend from Claim 1; Claims 16, 17, 19, 24, and 25 depend from Claim 15; and Claims 32, 33, and 37-39 depend from Claim 31. By virtue of their dependency and for other reasons, Applicants respectfully submit that Claims 2, 4, 6-8, 10, 16, 17, 19, 24, 25, 32, 33, and 37-39 are patentable over Betzler and are in condition for allowance. Applicants respectfully request reconsideration and allowance of Claims 2, 4, 6-8, 10, 16, 17, 19, 24, 25, 32, 33, and 37-39.

b. A PRIMA FACIE CASE OF OBVIOUSNESS HAS NOT BEEN ESTABLISHED BECAUSE BETZLER TEACHES AWAY FROM THE CLAIMED INVENTION

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because Betzler teaches away from the claimed invention.

As discussed above, Betzler teaches that a radiation measuring device includes criteria of small dimensions of the detector. In support of this objective, Betzler teaches that it is essential to design the bolometer detector structurally in such a way that the heat flow from the absorber side through the thin carrier foil to the resistor layer takes place in a much shorter time than the lateral dissipation of heat from the absorber layer to the dissipater. With a given thickness, a corresponding enlargement of the length and/or width results in an enlargement of the time constant. Conversely, with a given thickness, a corresponding decrease of the length and/or width results in a decrease of the time constant – which results in heat flow from the absorber side through the thin carrier foil to the resistor layer taking place in a much shorter time than the lateral dissipation of heat from the absorber layer to the dissipater.

To the contrary, Claim 1 recites “a temperature sensor attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the temperature sensor being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation”; Claim 15 recites “a wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change

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in temperature of a substantial portion of the body responsive to absorption of the captured radiation"; and Claim 31 recites "detecting a change in temperature of the body with wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation".

Thus, Applicants respectfully submit that, by teaching to reduce the length and/or width of the detector in order to reduce the time constant of the detector, Betzler teaches away from "a temperature sensor attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the temperature sensor being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation" as recited in Claim 1; "a wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation" as recited in Claim 15; and "detecting a change in temperature of the body with wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation" as recited in Claim 31.

Because Betzler teaches away from the claimed invention, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, and that Claims 1, 15, and 31 are patentable over Betzler and are in condition for allowance. Applicants respectfully request reconsideration and allowance of Claims 1, 15, and 31.

Claims 2, 4, 6-8, and 10 depend from Claim 1; Claims 16, 17, 19, 24, and 25 depend from Claim 15; and Claims 32, 33, and 37-39 depend from Claim 31. By virtue of their dependency and for other reasons, Applicants respectfully submit that Claims 2, 4, 6-8, 10, 16, 17, 19, 24, 25, 32, 33, and 37-39 are patentable over Betzler and are in condition for allowance. Applicants

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respectfully request reconsideration and allowance of Claims 2, 4, 6-8, 10, 16, 17, 19, 24, 25, 32, 33, and 37-39.

B. CLAIMS 3 AND 14

Claims 3 and 14 were finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Bourgade. Applicants very respectfully traverse.

1. THE BOURGADE REFERENCE

The Bourgade reference has been discussed above.

2. A PRIMA FACIE CASE OF OBVIOUSNESS HAS NOT BEEN ESTABLISHED BECAUSE BOURGADE DOES NOT TEACH OR SUGGEST (AND TEACHES AWAY FROM) THE CLAIMED INVENTION

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because Bourgade does not teach or suggest (and teaches away from) the claimed invention.

As discussed above, Bourgade teaches that in a calorimeter a thermopile or all of a plurality of thermopiles – but not a thermocouple or a plurality of thermocouples -- occupies at the most 20% of the surface of the inner face of the absorbing element. As also discussed above, minimizing the surface of the absorbing element occupied by the thermopile (to no more than 20%) and maximizing the surface of the absorbing element occupied by the resistance deposit (to up to 80%) enables calibration to be reliable and easily reproducible, thereby making it possible to simulate almost perfectly an energy deposit in the absorbing element. This is due to the fact that the calibration resistance is in contact with the inner face of the absorbing element over a large part of the inner face thereof (again, up to 80%) and in a zone (again, no more than 20%) not occupied by the thermopile.

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Therefore, Applicants respectfully submit that Bourgade does not teach or suggest, and teaches away from, "a temperature sensor attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the temperature sensor being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation" as recited in Claim 1, from which Claims 3 and 14 depend. Thus, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, that Claims 3 and 4 are not obvious and are patentable over Bourgade, and that Claims 3 and 4 are in condition for allowance. Applicants respectfully request reconsideration and allowance of Claims 3 and 4.

C. CLAIMS 14, 37, 38, AND 42-44

Claims 14, 37, 38, and 42-44 were finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Bourgade in view of U.S. Patent No. 3,665,762 to Domen. Applicants very respectfully traverse.

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because the combination of references does not teach or suggest the claimed invention and because both references teach away from the claimed invention.

1. THE BOURGADE REFERENCE

The Bourgade reference has been discussed above.

2. THE DOMEN REFERENCE

Domen discloses a heat loss compensated calorimeter wherein a core is surrounded by a jacket and the jacket is surrounded by a constant temperature, adiabatic or floating shield. The core and jacket have the same heat capacities, and thermistors having the same temperature coefficients are embedded in the core and jacket to compare the heat present, by means of a Wheatstone Bridge. Domen, at Abstract.

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Referring now to Figure 1, a calorimeter 10 has a core 12 encased in a jacket 14. Surrounding the jacket 14 is a shield 16 which can be (1) isothermal, i.e., maintained at a fixed temperature, (2) floating, i.e., seeking its own temperature, or (3) adiabatic, i.e., made to follow the temperature of the jacket. Domes, column 2, lines 42-47. Embedded in the core material 12 and also in the jacket 14 are thermistors 22 and 24 for use in measuring the heat generated in or lost from the calorimeter. Also embedded in core material 12 is a heater 26, which when connected to a source of potential can be used to inject heat into the core for calibration purposes and therefore to determine the absorbed dose in the core. *Id.*, column 2, lines 56-63. The shield preferably contains an embedded thermistor 27 and a heater 28 which aid in rapid cycling of the calorimeter in restoring the shield temperature to the initial value after each a radiation measurement and calibration run. The same recycling procedure is applied to the core and to the jacket. *Id.*, column 2, lines 64-68.

The inside surfaces of the jacket 14 facing the core 12 are provided with means to reflect radiation; for example, the inner wall of the jacket 14 may be coated with a thin layer of epoxy resin for firmly holding pieces of one-quarter mil aluminized "Mylar" (polyethylene terephthalate film). Such reflectorized film decreases the thermal radiation from the core by about a factor of ten. *Id.*, column 3, lines 48-54.

The surfaces of the core are preferably left bare for three reasons: (1) is important to minimize the amount of foreign material in the pure graphite core where absorbed dose measurements are made; (2) aluminizing the surfaces of the core would gain a reduction of heat loss from the core by only an additional factor of two; and (3) the heat loss corrections are well within 1 percent because sufficient temperature rises occur in short running times for particular electron beams that are used. Id., column 3, lines 54-62 (emphasis supplied).

3. A Prima Facie Case of Obviousness Has Not Been Established Because the Combination of References Does Not Teach or Suggest the Claimed Invention

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because the combination of references does not teach or suggest the claimed invention.

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As discussed above, Bourgade teaches that in a calorimeter a thermopile or all of a plurality of thermopiles – but not a thermocouple or a plurality of thermocouples -- occupies at the most 20% of the surface of the inner face of the absorbing element. Moreover, as discussed above, Domen teaches that the surfaces of the core are left bare. Thus, Domen does not overcome the above-noted deficiency of Bourgade.

Therefore, Applicants respectfully submit that the combination of the Bourgade and Domen references fails to teach or suggest “a temperature sensor attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the temperature sensor being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation” as recited in Claim 1, from which Claim 14 depends, and “detecting a change in temperature of the body with wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation” as recited in Claim 31, from which Claims 37, 38, and 42-44 depend.

Thus, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, that Claims 14, 37, 38, and 42-44 are not obvious and are patentable over the combination of the Bourgade and Domen references, and that Claims 14, 37, 38, and 42-44 are in condition for allowance. Applicants respectfully request reconsideration and allowance of Claims 14, 37, 38, and 42-44.

4. A PRIMA FACIE CASE OF OBVIOUSNESS HAS NOT BEEN ESTABLISHED
BECAUSE BOTH REFERENCES TEACH AWAY FROM THE CLAIMED INVENTION

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because both references teach away from the claimed invention.

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As discussed above, Bourgade teaches that in a calorimeter a thermopile or all of a plurality of thermopiles – but not a thermocouple or a plurality of thermocouples -- occupies at the most 20% of the surface of the inner face of the absorbing element. Moreover, as discussed above, Domen teaches that the surfaces of the core are left bare.

Therefore, Applicants respectfully submit that both the Bourgade and Domen references teach away from “a temperature sensor attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the temperature sensor being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation” as recited in Claim 1, from which Claim 14 depends, and “detecting a change in temperature of the body with wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation” as recited in Claim 31, from which Claims 37, 38, and 42-44 depend.

Thus, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, that Claims 14, 37, 38, and 42-44 are not obvious and are patentable over the Bourgade and Domen references, and that Claims 14, 37, 38, and 42-44 are in condition for allowance. Applicants respectfully request reconsideration and allowance of Claims 14, 37, 38, and 42-44.

D. CLAIM 5

Claim 5 was finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Bourgade in view of Domen and further in view of U.S. Patent No. 6,572,263 to Refalo et al. (“Refalo”). Applicants very respectfully traverse.

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because the combination of references does not teach or suggest the claimed invention and because the Bourgade and Domen references teach away from the claimed invention.

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1. THE BOURGADE AND DOMEN REFERENCES

The Bourgade and Domen references have been discussed above.

2. THE REFALO REFERENCE

Refalo discloses a heat-flow calorimeter 10 made up of a heat-conducting rod 16 with a test chamber 12 affixed to one end and a heat sink affixed to the other. The heat sink is maintained at a constant temperature and the heat liberated or absorbed by the test sample is measured by determining the amount of energy that must be introduced into the system to maintain a constant temperature differential across the length of the heat-conducting rod 16. Refalo, column 2, lines 14-21.

A zero heat transfer envelope 14 is used to insulate the unit and prevent heat from leaking into or out of the calorimeter. The envelope is made of three heat shield systems 23, 24, and 26. The first shield 23 is thin, highly conductive, and affixed to the measurement chamber 12. The sample is enclosed in the measurement chamber 12, thus allowing the first shield 23 to effectively match the sample temperature. The second shield 24 is relatively massive compared to the first shield 23 and its temperature is matched to that of the first shield 23. The third shield 26 surrounds the second shield 24 and its temperature is controlled to a constant value, thus protecting the zero heat transfer envelope 14 from ambient temperature variations. *Id.*, column 2, lines 22-33.

Each of the shields 24 and 26 is heated with distributed electrical resistance heaters 34 rather than a water jacket. This eliminates problems that typically arise from water jacketed heat shields, such as maintenance problems, potentially dangerous interactions between the samples and water, and corrosion. Temperature matching of the shields improves calorimeter sensitivity and accuracy. *Id.*, column 2, lines 34-40.

The sample well 12 is connected through a small area (constant temperature heat shield 22) to one end of the rod 16, which is highly thermally conductive. The other end of the rod 16 is connected to a precisely controlled heat removal device (heat pump 18). The sample well 12 is

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surrounded by the zero transfer envelope 14 containing the matching temperature shields 23, 24, 27, and 46 and at least one constant temperature shield 26. The close match in temperature of the various shields reduces the heat flow into and out of the sample well 12 to an extremely small and stable amount. *Id.*, column 5, line 65 – column 6, line 8.

The heat output from the sample is determined by measuring the power flowing through the conductive rod 16 and is measured using the power replacement method. Equilibrium power is first established (without a sample) by applying constant, accurately measured power to heaters 30, and the temperature at each end of the rod 16 is stabilized by control of the heat pump 18. When a set of equilibrium values has been established, a sample is placed in the sample well 12 and the calorimeter 10 is automatically controlled by varying the power of heaters 30 to maintain thermistor 38 at a fixed temperature value and varying the heat pump 18 to maintain a fixed temperature at thermistor 40. The reduction in power (from the equilibrium value) needed to maintain thermistor 38 at the fixed temperature will equal the amount of power added by the sample material. *Id.*, column 6, lines 12-26.

In order to obtain accurate calorimeter measurements, it is necessary to be certain that conditions in the calorimeter 10 are stable. Thus, thermistors 38 and 40 are monitored to determine whether the temperatures thereof are at their set points and stable with time. Also, temperature sensors 51 and 48, located on the top of the sample well 12 and the heat shield 27, respectively, are monitored to match the temperature of the heat shield 27 to that of the sample well 12, and stable with time. Also temperature sensors 50 and 52, located on the first and second heat shields, respectively, are monitored to match the temperature of the second heat shield 24 to that of the first heat shield 23, and stable with time. The temperature of the third, constant temperature shield is monitored by sensor 53 to determine if it is at its set point and stable with time. *Id.*, column 6, lines 27-42.

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3. A *Prima Facie* Case of Obviousness Has Not Been Established
Because the Combination of References Does Not Teach or Suggest the Claimed Invention

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because the combination of references does not teach or suggest the claimed invention.

As discussed above, Bourgade teaches that in a calorimeter a thermopile or all of a plurality of thermopiles – but not a thermocouple or a plurality of thermocouples -- occupies at the most 20% of the surface of the inner face of the absorbing element. Moreover, as discussed above, Domen teaches that the surfaces of the core are left bare. Thus, Domen does not overcome the above-noted deficiency of Bourgade. Further, as discussed above, Refalo teaches use of two discrete temperature sensors (thermistors 38 and 40) placed at two ends of the conductive rod 16 to sense temperature changes that result from energy added by the radioactive sample placed in the sample well 12 and use of a third discrete temperature sensor 51 placed at an opposite end of the sample well 12 from the conductive rod 16 to match temperature of the heat shield 27 to that of the sample well 12. Thus Refalo does not overcome the above-noted deficiencies of Bourgade and Domen.

Therefore, Applicants respectfully submit that the combination of the Bourgade, Domen, and Refalo references fails to teach or suggest “a temperature sensor attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the temperature sensor being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation” as recited in Claim 1, from which Claim 5 depends. Thus, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, that Claim 5 is not obvious and is patentable over the combination of Bourgade, Domen, and Refalo, and that Claim 5 is in condition for allowance. Applicants respectfully request reconsideration and allowance of Claim 5.

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4. A PRIMA FACIE CASE OF OBVIOUSNESS HAS NOT BEEN ESTABLISHED
BECAUSE THE BOURGADE AND DOMEN REFERENCES TEACH AWAY FROM THE CLAIMED INVENTION

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because the Bourgade and Domen references teach away from the claimed invention.

As discussed above, Bourgade teaches that in a calorimeter a thermopile or all of a plurality of thermopiles – but not a thermocouple or a plurality of thermocouples -- occupies at the most 20% of the surface of the inner face of the absorbing element. Moreover, as discussed above, Domen teaches that the surfaces of the core are left bare.

Therefore, Applicants respectfully submit that both the Bourgade and Domen references teach away from “a temperature sensor attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the temperature sensor being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation” as recited in Claim 1, from which Claim 5 depends. Thus, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, that Claim 5 is not obvious and is patentable over the combination of Bourgade, Domen, and Refalo, and that Claim 5 is in condition for allowance. Applicants respectfully request reconsideration and allowance of Claim 5.

E. CLAIMS 5-8, 15-18, 23-25, 38, AND 39

Claims 5-8, 15-18, 23-25, 38, and 39 were finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Bourgade in view of Domen and further in view of U.S. Patent Application Publication No. US 2003/0099276 to Argenti. Applicants very respectfully traverse.

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because the combination of references does not teach or suggest the claimed invention and because the Bourgade, Domen, and Argenti references all teach away from the claimed invention.

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1. THE BOURGADE AND DOMEN REFERENCES

The Bourgade and Domen references have been discussed above.

2. THE ARGENTI REFERENCE

Referring to Figure 1, Argenti discloses an instrument 1 for measuring power emitted by a source of coherent or incoherent radiation, particularly of the laser type, that comprises an absorbent mass 2 having a known heat capacity, which is connected to a supporting body 3, which has a handle portion 4 and a display 5. Argenti, paragraph 22. The instrument 1 comprises means for sensing the variation over time of the temperature and that are provided by a first temperature sensor 10 and a second temperature sensor 11, which are constituted by a *first thermocouple 10* or by a thermopile that is *placed in close thermal contact with the center of gravity of the absorbent mass 2* and by a second thermocouple 11 or by a thermopile that is arranged inside the supporting body, for example inside the handle 4. *Id.*, paragraph 23 (emphasis supplied).

It is also possible to arrange the first and second sensors on the thermal mass in two spaced points, for example one sensor in a central region of the absorbent mass and the other sensor in a radially spaced point. *Id.*, paragraph 24. *The two thermocouples 10 and 11 are thermally insulated from each other.* *Id.*, paragraph 26 (emphasis supplied).

3. A *Prima Facie* Case of Obviousness Has Not Been Established Because the Combination of References Does Not Teach or Suggest the Claimed Invention

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because the combination of references does not teach or suggest the claimed invention.

As discussed above, Bourgade teaches that in a calorimeter a thermopile or all of a plurality of thermopiles – but not a thermocouple or a plurality of thermocouples -- occupies at the most 20% of the surface of the inner face of the absorbing element. Moreover, as discussed above,

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Domen teaches that the surfaces of the core are left bare. Thus, Domen does not overcome the above-noted deficiency of Bourgade.

Further, as discussed above, Argenti teaches that a first temperature sensor 10 and a second temperature sensor 11 are constituted by a first thermocouple 10 or by a thermopile that is placed in close thermal contact with the center of gravity of the absorbent mass 2 and by a second thermocouple 11 or by a thermopile that is arranged inside the supporting body, for example inside the handle 4. Argenti also teaches arranging the first and second sensors on the thermal mass in two spaced points, for example one sensor in a central region of the absorbent mass and the other sensor in a radially spaced point. The two thermocouples 10 and 11 are thermally insulated from each other. Thus Argenti does not overcome the above-noted deficiencies of Bourgade and Domen.

Therefore, Applicants respectfully submit that the combination of the Bourgade, Domen, and Argenti references fails to teach or suggest "a temperature sensor attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the temperature sensor being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation" as recited in Claim 1, from which Claim 5 depends, or "a wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation" as recited in Claim 15, from which Claims 16-18 and 23-25 depend, or "detecting a change in temperature of the body with wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation" as recited in Claim 31, from which Claims 38 and 39 depend.

Thus, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, that Claims 5-8, 15-18, 23-25, 38, and 39 are not obvious and are patentable over the combination of Bourgade, Domen, and Refalo, and that Claims 5-8, 15-18, 23-25, 38, and 39 are in

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condition for allowance. Applicants respectfully request reconsideration and allowance of Claims 5-8, 15-18, 23-25, 38, and 39.

4. A PRIMA FACIE CASE OF OBVIOUSNESS HAS NOT BEEN ESTABLISHED
BECAUSE ALL OF THE REFERENCES TEACH AWAY FROM THE CLAIMED INVENTION

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because all of the references teach away from the claimed invention.

As discussed above, Bourgade teaches that in a calorimeter a thermopile or all of a plurality of thermopiles – but not a thermocouple or a plurality of thermocouples -- occupies at the most 20% of the surface of the inner face of the absorbing element. Moreover, as discussed above, Domen teaches that the surfaces of the core are left bare. Further, Argenti teaches use of two temperature sensors that are located in two spaced points, such as in the center of the mass and in a handle, and that are thermally insulated from each other.

Therefore, Applicants respectfully submit that each of the Bourgade, Domen, and Argenti references teach away from “a temperature sensor attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the temperature sensor being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation” as recited in Claim 1, from which Claim 5 depends, or “a wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation” as recited in Claim 15, from which Claims 16-18 and 23-25 depend, and “detecting a change in temperature of the body with wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation” as recited in Claim 31, from which Claims 38 and 39 depend.

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Thus, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, that Claims 5-8, 15-18, 23-25, 38, and 39 are not obvious and are patentable over the combination of Bourgade, Domen, and Argenti, and that Claims 5-8, 15-18, 23-25, 38, and 39 are in condition for allowance. Applicants respectfully request reconsideration and allowance of Claims 5-8, 15-18, 23-25, 38, and 39.

F. CLAIMS 11, 12, 26-29, 34, AND 35

Claims 11, 12, 26-29, 34, and 35 were finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Bourgade in view of U.S. Patent No. 5,876,118 to Vogel. Applicants very respectfully traverse.

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because the combination of references does not teach or suggest the claimed invention and because the Bourgade reference teaches away from the claimed invention.

1. THE BOURGADE REFERENCE

The Bourgade reference has been discussed above.

2. THE VOGEL REFERENCE

Vogel discloses a calorimeter apparatus including a facility for rapid cooling of a heating vessel therein. A jacket surrounds the vessel wall. A partition member between the jacket and the vessel wall defines an inlet plenum adjacent the jacket and a spatial gap adjacent the vessel wall. Pressurized cooling gas is conveyed into the inlet plenum after termination of heating the vessel. The partition member has a distributed plurality of orifices such that the gas is jetted through the orifices to impingement cool the vessel wall. The gas is discharged from the spatial gap through an outlet plenum at an end wall of the vessel. The plurality of orifices are distributed in a pattern of varying density across the partition member such that uniform cooling of the vessel wall by the jetted gas is effected. Vogel, at Abstract.

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3. A *Prima Facie* Case of Obviousness Has Not Been Established
Because the Combination of References Does Not Teach or Suggest the Claimed Invention

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because the combination of references does not teach or suggest the claimed invention.

As discussed above, Bourgade teaches that in a calorimeter a thermopile or all of a plurality of thermopiles – but not a thermocouple or a plurality of thermocouples -- occupies at the most 20% of the surface of the inner face of the absorbing element. Moreover, as discussed above, Vogel teaches the use of pressurized gas to cool a wall of a heating vessel. Thus, Vogel does not address and cannot overcome the above-noted deficiency of Bourgade.

Therefore, Applicants respectfully submit that the combination of the Bourgade and Vogel references fails to teach or suggest “a temperature sensor attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the temperature sensor being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation” as recited in Claim 1, from which Claims 11 and 12 depend, and as recited in Claim 26, from which Claims 27-29 depend, or “detecting a change in temperature of the body with wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation” as recited in Claim 31, from which Claims 34 and 35 depend.

Thus, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, that Claims 11, 12, 26-29, 34, and 35 are not obvious and are patentable over the combination of the Bourgade and Vogel references, and that Claims 11, 12, 26-29, 34, and 35 are in condition for allowance. Applicants respectfully request reconsideration and allowance of Claims 11, 12, 26-29, 34, and 35.

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4. A PRIMA FACIE CASE OF OBVIOUSNESS HAS NOT BEEN ESTABLISHED
BECAUSE THE BOURGADE REFERENCE TEACHES AWAY FROM THE CLAIMED INVENTION

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because the Bourgade reference teaches away from the claimed invention.

As discussed above, Bourgade teaches that in a calorimeter a thermopile or all of a plurality of thermopiles – but not a thermocouple or a plurality of thermocouples -- occupies at the most 20% of the surface of the inner face of the absorbing element.

Therefore, Applicants respectfully submit that Bourgade teaches away from “a temperature sensor attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the temperature sensor being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation” as recited in Claim 1, from which Claims 11 and 12 depend, and as recited in Claim 26, from which Claims 27-29 depend, and “detecting a change in temperature of the body with wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation” as recited in Claim 31, from which Claims 34 and 35 depend.

Thus, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, that Claims 11, 12, 26-29, 34, and 35 are not obvious and are patentable over the combination of the Bourgade and Vogel references, and that Claims 11, 12, 26-29, 34, and 35 are in condition for allowance. Applicants respectfully request reconsideration and allowance of Claims 11, 12, 26-29, 34, and 35.

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G. CLAIMS 19-21

Claims 19-21 were finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Bourgade in view of Domen and Argenti and further in view of Vogel. Applicant respectfully traverses.

1. THE CITED REFERENCES

All of the cited references have been discussed above.

2. A *Prima Facie* Case of Obviousness Has Not Been Established Because the Combination of References Does Not Teach or Suggest the Claimed Invention

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because the combination of references does not teach or suggest the claimed invention.

As discussed above, Bourgade teaches that in a calorimeter a thermopile or all of a plurality of thermopiles – but not a thermocouple or a plurality of thermocouples -- occupies at the most 20% of the surface of the inner face of the absorbing element. Moreover, as discussed above, Domen teaches that the surfaces of the core are left bare. Thus, Domen does not overcome the above-noted deficiency of Bourgade. Further, Argenti teaches use of two temperature sensors that are located in two spaced points, such as in the center of the mass and in a handle, and that are thermally insulated from each other. Thus Argenti does not overcome the above-noted deficiencies of Bourgade and Domen. Finally, Vogel teaches the use of pressurized gas to cool a wall of a heating vessel. Thus, Vogel does not address and cannot overcome the above-noted deficiencies of Bourgade, Domen, and Argenti.

Therefore, Applicants respectfully submit that the combination of the Bourgade, Domen, Argenti, and Vogel references fails to teach or suggest “a wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change

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in temperature of a substantial portion of the body responsive to absorption of the captured radiation” as recited in Claim 15, from which Claims 19-21 depend. Thus, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, that Claims 19-21 are not obvious and are patentable over the combination of Bourgade, Domen, Argenti, and Vogel, and that Claims 19-21 are in condition for allowance. Applicants respectfully request reconsideration and allowance of Claims 19-21.

3. A PRIMA FACIE CASE OF OBVIOUSNESS HAS NOT BEEN ESTABLISHED BECAUSE THE BOURGADE, DOMEN, AND ARGENTI REFERENCES TEACH AWAY FROM THE CLAIMED INVENTION

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because the Bourgade, Domen, and Argenti references all teach away from the claimed invention.

As discussed above, Bourgade teaches that in a calorimeter a thermopile or all of a plurality of thermopiles – but not a thermocouple or a plurality of thermocouples – occupies at the most 20% of the surface of the inner face of the absorbing element. Moreover, as discussed above, Domen teaches that the surfaces of the core are left bare. Further, Argenti teaches use of two temperature sensors that are located in two spaced points, such as in the center of the mass and in a handle, and that are thermally insulated from each other.

Therefore, Applicants respectfully submit that each of the Bourgade, Domen, and Argenti references teach away from “a wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation” as recited in Claim 15, from which Claims 19-21 depend. Thus, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, that Claims 19-21 are not obvious and are patentable over the

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combination of Bourgade, Domen, Argenti, and Vogel, and that Claims 19-21 are in condition for allowance. Applicants respectfully request reconsideration and allowance of Claims 19-21.

H. CLAIMS 13 AND 36

Claims 13 and 36 were finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Bourgade in view of U.S. Patent No. 3,508,056 to Fricke. Applicants very respectfully traverse.

1. THE BOURGADE REFERENCE

The Bourgade reference is discussed above.

2. THE FRICKE REFERENCE

Fricke discloses a radiation power indicator for measuring the power in high power laser beams includes an energy absorbing detector. A heat sink rapidly conducts thermal energy away from the detector. The incident beam power is measured as a function of the thermal gradient across a thermal conductor between the detector and the heat sink. Fricke, at Abstract.

3. A Prima Facie Case of Obviousness Has Not Been Established Because the Combination of References Does Not Teach or Suggest the Claimed Invention

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because the combination of references does not teach or suggest the claimed invention.

As discussed above, Bourgade teaches that in a calorimeter a thermopile or all of a plurality of thermopiles – but not a thermocouple or a plurality of thermocouples -- occupies at the most 20% of the surface of the inner face of the absorbing element. Moreover, as discussed above, Fricke teaches that incident beam power is measured as a function of the thermal gradient across a

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thermal conductor between the detector and the heat sink. Thus, Fricke does not overcome the above-noted deficiency of Bourgade.

Therefore, Applicants respectfully submit that the combination of the Bourgade and Fricke references fails to teach or suggest "a temperature sensor attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the temperature sensor being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation" as recited in Claim 1, from which Claim 13 depends, or "detecting a change in temperature of the body with wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation" as recited in Claim 31, from which Claim 36 depends.

Thus, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, that Claims 13 and 36 are not obvious and are patentable over the combination of the Bourgade and Fricke references, and that Claims 13 and 36 are in condition for allowance. Applicants respectfully request reconsideration and allowance of Claims 13 and 36.

4. A PRIMA FACIE CASE OF OBVIOUSNESS HAS NOT BEEN ESTABLISHED
BECAUSE THE BOURGADE REFERENCE TEACHES AWAY FROM THE CLAIMED INVENTION

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because the Bourgade reference teaches away from the claimed invention.

As discussed above, Bourgade teaches that in a calorimeter a thermopile or all of a plurality of thermopiles -- but not a thermocouple or a plurality of thermocouples -- occupies at the most 20% of the surface of the inner face of the absorbing element.

Therefore, Applicants respectfully submit that the Bourgade reference teaches away from "a temperature sensor attached over a substantial portion of the body in thermal

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communication with a substantial portion of the body, the temperature sensor being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation" as recited in Claim 1, from which Claim 13 depends, and "detecting a change in temperature of the body with wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation" as recited in Claim 31, from which Claim 36 depends.

Thus, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, that Claims 13 and 36 are not obvious and are patentable over the combination of the Bourgade and Fricke references, and that Claims 13 and 36 are in condition for allowance. Applicants respectfully request reconsideration and allowance of Claims 13 and 36.

I. CLAIM 30

Claim 30 was finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Bourgade in view of Vogel and further in view of Fricke. Applicants very respectfully traverse.

1. THE CITED REFERENCES

The cited references have been discussed above.

2. A Prima Facie Case of Obviousness Has Not Been Established Because the Combination of References Does Not Teach or Suggest the Claimed Invention

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because the combination of references does not teach or suggest the claimed invention.

As discussed above, Bourgade teaches that in a calorimeter a thermopile or all of a plurality of thermopiles – but not a thermocouple or a plurality of thermocouples – occupies at the

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most 20% of the surface of the inner face of the absorbing element. Moreover, as discussed above, Vogel teaches the use of pressurized gas to cool a wall of a heating vessel. Thus, Vogel does not address and cannot overcome the above-noted deficiency of Bourgade. Further, Fricke teaches that incident beam power is measured as a function of the thermal gradient across a thermal conductor between the detector and the heat sink. Thus, Fricke does not overcome the above-noted deficiencies of Bourgade and Vogel.

Therefore, Applicants respectfully submit that the combination of the Bourgade, Vogel, and Fricke references fails to teach or suggest "a temperature sensor attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the temperature sensor being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation" as recited in Claim 26, from which Claim 30 depends. Thus, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, that Claim 30 is not obvious and is patentable over the combination of the Bourgade, Vogel, and Fricke references, and that Claim 30 is in condition for allowance. Applicants respectfully request reconsideration and allowance of Claim 30.

3. A PRIMA FACIE CASE OF OBVIOUSNESS HAS NOT BEEN ESTABLISHED
BECAUSE THE BOURGADE REFERENCE TEACHES AWAY FROM THE CLAIMED INVENTION

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because the Bourgade reference teaches away from the claimed invention.

As discussed above, Bourgade teaches that in a calorimeter a thermopile or all of a plurality of thermopiles -- but not a thermocouple or a plurality of thermocouples -- occupies at the most 20% of the surface of the inner face of the absorbing element.

Therefore, Applicants respectfully submit that Bourgade teaches away from "a temperature sensor attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the temperature sensor being configured to detect a change in

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temperature of a substantial portion of the body responsive to absorption of the captured radiation” as recited in Claim 26, from which Claim 30 depends. Thus, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, that Claim 30 is not obvious and is patentable over the combination of the Bourgade, Vogel, and Fricke references, and that Claim 30 is in condition for allowance. Applicants respectfully request reconsideration and allowance of Claim 30.

J. CLAIM 22

Claim 22 was finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Bourgade in view of Domen and Argenti and further in view of Fricke. Applicant respectfully traverses.

1. THE CITED REFERENCES

All of the cited references have been discussed above.

2. A Prima Facie Case of Obviousness Has Not Been Established Because the Combination of References Does Not Teach or Suggest the Claimed Invention

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because the combination of references does not teach or suggest the claimed invention.

As discussed above, Bourgade teaches that in a calorimeter a thermopile or all of a plurality of thermopiles – but not a thermocouple or a plurality of thermocouples -- occupies at the most 20% of the surface of the inner face of the absorbing element. Moreover, as discussed above, Domen teaches that the surfaces of the core are left bare. Thus, Domen does not overcome the above-noted deficiency of Bourgade. Further, Argenti teaches use of two temperature sensors that are located in two spaced points, such as in the center of the mass and in a handle, and that are thermally insulated from each other. Thus Argenti does not overcome the above-noted deficiencies of Bourgade and Domen. Finally, Fricke teaches that incident beam power is measured as a

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function of the thermal gradient across a thermal conductor between the detector and the heat sink. Thus, Fricke does not overcome the above-noted deficiencies of Bourgade, Domen, and Argenti.

Therefore, Applicants respectfully submit that the combination of the Bourgade, Domen, Argenti, and Fricke references fails to teach or suggest "a wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation" as recited in Claim 15, from which Claim 22 depends. Thus, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, that Claim 22 is not obvious and is patentable over the combination of Bourgade, Domen, Argenti, and Fricke, and that Claim 22 is in condition for allowance. Applicants respectfully request reconsideration and allowance of Claim 22.

3. A PRIMA FACIE CASE OF OBVIOUSNESS HAS NOT BEEN ESTABLISHED BECAUSE THE BOURGADE, DOMEN, AND ARGENTI REFERENCES TEACH AWAY FROM THE CLAIMED INVENTION

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because the Bourgade, Domen, and Argenti references all teach away from the claimed invention.

As discussed above, Bourgade teaches that in a calorimeter a thermopile or all of a plurality of thermopiles – but not a thermocouple or a plurality of thermocouples -- occupies at the most 20% of the surface of the inner face of the absorbing element. Moreover, as discussed above, Domen teaches that the surfaces of the core are left bare. Further, Argenti teaches use of two temperature sensors that are located in two spaced points, such as in the center of the mass and in a handle, and that are thermally insulated from each other.

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Therefore, Applicants respectfully submit that each of the Bourgade, Domen, and Argenti references teach away from "a wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation" as recited in Claim 15, from which Claim 22 depends. Thus, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, that Claim 22 is not obvious and is patentable over the combination of Bourgade, Domen, Argenti, and Fricke, and that Claim 22 is in condition for allowance. Applicants respectfully request reconsideration and allowance of Claim 22.

K. CLAIMS 40 AND 41

Claims 40 and 41 were finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Bourgade in view of U.S. Patent No. 6,513,994 to DiGiovanni et al. (DiGiovanni). Applicants very respectfully traverse.

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because the combination of references does not teach or suggest the claimed invention and because the Bourgade reference teaches away from the claimed invention.

1. THE BOURGADE REFERENCE

The Bourgade reference has been discussed above.

2. THE DIGIOVANNI REFERENCE

DiGiovanni *et al.* discloses a technique for evaluating optical fiber splices. The thermal power emanating from the fiber splices as the result of absorption of the light carried by the fiber is detected. The technique is particularly suited for cladding pumped lasers wherein the splicing operation may introduce excessive absorption of pump laser radiation and excessive heating at the splice locale. DiGiovanni *et al.*, at Abstract.

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3. A *Prima Facie* Case of Obviousness Has Not Been Established
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Applicants respectfully submit that a *prima facie* case of obviousness has not been established because the combination of references does not teach or suggest the claimed invention.

As discussed above, Bourgade teaches that in a calorimeter a thermopile or all of a plurality of thermopiles – but not a thermocouple or a plurality of thermocouples -- occupies at the most 20% of the surface of the inner face of the absorbing element. Moreover, as discussed above, DiGiovanni teaches that the thermal power emanating from the fiber splices as the result of absorption of the light carried by the fiber is detected. Thus, DiGiovanni does not address and therefore cannot, and does not, overcome the above-noted deficiency of Bourgade.

Therefore, Applicants respectfully submit that the combination of the Bourgade and DiGiovanni references fails to teach or suggest “detecting a change in temperature of the body with wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation” as recited in Claim 31, from which Claims 40 and 41 depend.

Thus, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, that Claims 40 and 41 are not obvious and are patentable over the combination of the Bourgade and DiGiovanni references, and that Claims 40 and 41 are in condition for allowance. Applicants respectfully request reconsideration and allowance of Claims 40 and 41.

4. A *PRIMA FACIE* CASE OF OBVIOUSNESS HAS NOT BEEN ESTABLISHED
BECAUSE THE BOURGADE REFERENCE TEACHES AWAY FROM THE CLAIMED INVENTION

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because the Bourgade reference teaches away from the claimed invention.

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As discussed above, Bourgade teaches that in a calorimeter a thermopile or all of a plurality of thermopiles – but not a thermocouple or a plurality of thermocouples -- occupies at the most 20% of the surface of the inner face of the absorbing element.

Therefore, Applicants respectfully submit that the Bourgade reference teaches away from “detecting a change in temperature of the body with wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation” as recited in Claim 31, from which Claims 40 and 41 depend.

Thus, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, that Claims 40 and 41 are not obvious and are patentable over the combination of the Bourgade and DiGiovanni references, and that Claims 40 and 41 are in condition for allowance. Applicants respectfully request reconsideration and allowance of Claims 40 and 41.

L. CLAIMS 5 AND 23

Claims 5 and 23 were finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Betzler in view of Refalo. Applicants very respectfully traverse.

1. THE CITED REFERENCES

The cited references have been discussed above.

2. A *Prima Facie* Case of Obviousness Has Not Been Established Because the Combination of References Does Not Teach or Suggest the Claimed Invention

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because the combination of references does not teach or suggest the claimed invention.

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Betzler is directed to a radiation measuring device that includes criteria of small dimensions of the detector. In support of this objective, Betzler teaches that it is essential to design the bolometer detector structurally in such a way that the heat flow from the absorber side through the thin carrier foil to the resistor layer takes place in a much shorter time than the lateral dissipation of heat from the absorber layer to the dissipater. With a given thickness, a corresponding enlargement of the length and/or width results in an enlargement of the time constant. Conversely, with a given thickness, a corresponding decrease of the length and/or width results in a decrease of the time constant – which results in heat flow from the absorber side through the thin carrier foil to the resistor layer taking place in a much shorter time than the lateral dissipation of heat from the absorber layer to the dissipater.

Refalo teaches use of two discrete temperature sensors (thermistors 38 and 40) placed at two ends of the conductive rod 16 to sense temperature changes that result from energy added by the radioactive sample placed in the sample well 12 and use of a third discrete temperature sensor 51 placed at an opposite end of the sample well 12 from the conductive rod 16 to match temperature of the heat shield 27 to that of the sample well 12. Thus Refalo does not overcome the above-noted deficiency of Betzler.

Thus, Applicants respectfully submit that the combination of Betzler and Refalo does not teach or suggest “a temperature sensor attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the temperature sensor being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation” as recited in Claim 1, from which Claim 5 depends, or “a wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation” as recited in Claim 15, from which Claim 23 depends.

Thus, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, and that Claims 5 and 23 are patentable over the combination of Betzler and Refalo and

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are in condition for allowance. Applicants respectfully request reconsideration and allowance of Claims 5 and 23.

3. A PRIMA FACIE CASE OF OBVIOUSNESS HAS NOT BEEN ESTABLISHED
BECAUSE BETZLER TEACHES AWAY FROM THE CLAIMED INVENTION

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because Betzler teaches away from the claimed invention.

As discussed above, Betzler teaches that a radiation measuring device includes criteria of small dimensions of the detector. In support of this objective, Betzler teaches that it is essential to design the bolometer detector structurally in such a way that the heat flow from the absorber side through the thin carrier foil to the resistor layer takes place in a much shorter time than the lateral dissipation of heat from the absorber layer to the dissipater. With a given thickness, a corresponding enlargement of the length and/or width results in an enlargement of the time constant. Conversely, with a given thickness, a corresponding decrease of the length and/or width results in a decrease of the time constant – which results in heat flow from the absorber side through the thin carrier foil to the resistor layer taking place in a much shorter time than the lateral dissipation of heat from the absorber layer to the dissipater.

Thus, Applicants respectfully submit that, by teaching to reduce the length and/or width of the detector in order to reduce the time constant of the detector, Betzler teaches away from “a temperature sensor attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the temperature sensor being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation” as recited in Claim 1, from which Claim 5 depends, and “a wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation” as recited in Claim 15, from which Claim 23 depends.

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Because Betzler teaches away from the claimed invention, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, and that Claims 5 and 23 are patentable over the combination of Betzler and Refalo and are in condition for allowance. Applicants respectfully request reconsideration and allowance of Claims 5 and 23.

M. CLAIMS 11, 12, 20, 21, 34, AND 35

Claims 11, 12, 20, 21, 34, and 35 were finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Betzler in view of Vogel. Applicants very respectfully traverse.

1. THE CITED REFERENCES

The cited references have been discussed above.

2. A Prima Facie Case of Obviousness Has Not Been Established Because the Combination of References Does Not Teach or Suggest the Claimed Invention

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because the combination of references does not teach or suggest the claimed invention.

Betzler is directed to a radiation measuring device that includes criteria of small dimensions of the detector. In support of this objective, Betzler teaches that it is essential to design the bolometer detector structurally in such a way that the heat flow from the absorber side through the thin carrier foil to the resistor layer takes place in a much shorter time than the lateral dissipation of heat from the absorber layer to the dissipater. With a given thickness, a corresponding enlargement of the length and/or width results in an enlargement of the time constant. Conversely, with a given thickness, a corresponding decrease of the length and/or width results in a decrease of the time constant – which results in heat flow from the absorber side through the thin carrier foil to the resistor layer taking place in a much shorter time than the lateral dissipation of heat from the absorber layer to the dissipater.

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Vogel teaches the use of pressurized gas to cool a wall of a heating vessel. Thus, Vogel does not address and cannot overcome the above-noted deficiency of Betzler.

Thus, Applicants respectfully submit that the combination of Betzler and Vogel does not teach or suggest "a temperature sensor attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the temperature sensor being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation" as recited in Claim 1, from which Claims 11 and 12 depend, or "a wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation" as recited in Claim 15 from which Claims 20 and 21 depend, or "detecting a change in temperature of the body with wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation" as recited in Claim 31, from which Claims 34 and 35 depend.

Therefore, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, and that Claims 11, 12, 20, 21, 34, and 35 are patentable over the combination of Betzler and Vogel and are in condition for allowance. Applicants respectfully request reconsideration and allowance of Claims 11, 12, 20, 21, 34, and 35.

3. A PRIMA FACIE CASE OF OBVIOUSNESS HAS NOT BEEN ESTABLISHED
BECAUSE BETZLER TEACHES AWAY FROM THE CLAIMED INVENTION

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because Betzler teaches away from the claimed invention.

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As discussed above, Betzler teaches that a radiation measuring device includes criteria of small dimensions of the detector. In support of this objective, Betzler teaches that it is essential to design the bolometer detector structurally in such a way that the heat flow from the absorber side through the thin carrier foil to the resistor layer takes place in a much shorter time than the lateral dissipation of heat from the absorber layer to the dissipater. With a given thickness, a corresponding enlargement of the length and/or width results in an enlargement of the time constant. Conversely, with a given thickness, a corresponding decrease of the length and/or width results in a decrease of the time constant – which results in heat flow from the absorber side through the thin carrier foil to the resistor layer taking place in a much shorter time than the lateral dissipation of heat from the absorber layer to the dissipater.

Thus, Applicants respectfully submit that, by teaching to reduce the length and/or width of the detector in order to reduce the time constant of the detector, Betzler teaches away from “a temperature sensor attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the temperature sensor being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation” as recited in Claim 1, from which Claims 11 and 12 depend, or “a wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation” as recited in Claim 15 from which Claims 20 and 21 depend, and “detecting a change in temperature of the body with wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation” as recited in Claim 31, from which Claims 34 and 35 depend.

Therefore, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, and that Claims 11, 12, 20, 21, 34, and 35 are patentable over the combination of

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Betzler and Vogel and are in condition for allowance. Applicants respectfully request reconsideration and allowance of Claims 11, 12, 20, 21, 34, and 35.

N. CLAIMS 13, 22, AND 36

Claims 13, 22, and 36 were finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Betzler in view of Fricke. Applicants very respectfully traverse.

1. THE CITED REFERENCES

The cited references have been discussed above.

2. A *Prima Facie* Case of Obviousness Has Not Been Established Because the Combination of References Does Not Teach or Suggest the Claimed Invention

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because the combination of references does not teach or suggest the claimed invention.

Betzler is directed to a radiation measuring device that includes criteria of small dimensions of the detector. In support of this objective, Betzler teaches that it is essential to design the bolometer detector structurally in such a way that the heat flow from the absorber side through the thin carrier foil to the resistor layer takes place in a much shorter time than the lateral dissipation of heat from the absorber layer to the dissipater. With a given thickness, a corresponding enlargement of the length and/or width results in an enlargement of the time constant. Conversely, with a given thickness, a corresponding decrease of the length and/or width results in a decrease of the time constant – which results in heat flow from the absorber side through the thin carrier foil to the resistor layer taking place in a much shorter time than the lateral dissipation of heat from the absorber layer to the dissipater.

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Fricke teaches that incident beam power is measured as a function of the thermal gradient across a thermal conductor between the detector and the heat sink. Thus, Fricke does not overcome the above-noted deficiency of Betzler.

Thus, Applicants respectfully submit that the combination of Betzler and Fricke does not teach or suggest "a temperature sensor attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the temperature sensor being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation" as recited in Claim 1, from which Claim 13 depends, or "a wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation" as recited in Claim 15 from which Claim 22 depends, or "detecting a change in temperature of the body with wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation" as recited in Claim 31, from which Claim 36 depends.

Therefore, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, and that Claims 13, 22, and 36 are patentable over the combination of Betzler and Fricke and are in condition for allowance. Applicants respectfully request reconsideration and allowance of Claims 13, 22, and 36.

3. A PRIMA FACIE CASE OF OBVIOUSNESS HAS NOT BEEN ESTABLISHED
BECAUSE BETZLER TEACHES AWAY FROM THE CLAIMED INVENTION

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because Betzler teaches away from the claimed invention.

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As discussed above, Betzler teaches that a radiation measuring device includes criteria of small dimensions of the detector. In support of this objective, Betzler teaches that it is essential to design the bolometer detector structurally in such a way that the heat flow from the absorber side through the thin carrier foil to the resistor layer takes place in a much shorter time than the lateral dissipation of heat from the absorber layer to the dissipater. With a given thickness, a corresponding enlargement of the length and/or width results in an enlargement of the time constant. Conversely, with a given thickness, a corresponding decrease of the length and/or width results in a decrease of the time constant – which results in heat flow from the absorber side through the thin carrier foil to the resistor layer taking place in a much shorter time than the lateral dissipation of heat from the absorber layer to the dissipater.

Thus, Applicants respectfully submit that, by teaching to reduce the length and/or width of the detector in order to reduce the time constant of the detector, Betzler teaches away from “a temperature sensor attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the temperature sensor being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation” as recited in Claim 1, from which Claim 13 depends, or “a wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation” as recited in Claim 15 from which Claim 22 depends, and “detecting a change in temperature of the body with wire having resistance that varies with temperature, the wire being attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the wire being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation” as recited in Claim 31, from which Claim 36 depends.

Therefore, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, and that Claims 13, 22, and 36 are patentable over the combination of Betzler and

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Fricke and are in condition for allowance. Applicants respectfully request reconsideration and allowance of Claims 13, 22, and 36.

O. CLAIM 30

Claim 30 was finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Betzler in view of Vogel and further in view of Fricke. Applicants very respectfully traverse.

1. THE CITED REFERENCES

The cited references have been discussed above.

2. A *Prima Facie* Case of Obviousness Has Not Been Established Because the Combination of References Does Not Teach or Suggest the Claimed Invention

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because the combination of references does not teach or suggest the claimed invention.

Betzler is directed to a radiation measuring device that includes criteria of small dimensions of the detector. In support of this objective, Betzler teaches that it is essential to design the bolometer detector structurally in such a way that the heat flow from the absorber side through the thin carrier foil to the resistor layer takes place in a much shorter time than the lateral dissipation of heat from the absorber layer to the dissipater. With a given thickness, a corresponding enlargement of the length and/or width results in an enlargement of the time constant. Conversely, with a given thickness, a corresponding decrease of the length and/or width results in a decrease of the time constant – which results in heat flow from the absorber side through the thin carrier foil to the resistor layer taking place in a much shorter time than the lateral dissipation of heat from the absorber layer to the dissipater.

Vogel teaches the use of pressurized gas to cool a wall of a heating vessel. Thus, Vogel does not address and cannot overcome the above-noted deficiency of Betzler. Fricke teaches that

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incident beam power is measured as a function of the thermal gradient across a thermal conductor between the detector and the heat sink. Thus, Fricke does not overcome the above-noted deficiencies of Betzler and Vogel.

Thus, Applicants respectfully submit that the combination of Betzler, Vogel, and Fricke does not teach or suggest "a temperature sensor attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the temperature sensor being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation" as recited in Claim 26, from which Claim 30 depends.

Therefore, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, and that Claim 30 is patentable over the combination of Betzler, Vogel, and Fricke and is in condition for allowance. Applicants respectfully request reconsideration and allowance of Claim 30.

3. A PRIMA FACIE CASE OF OBVIOUSNESS HAS NOT BEEN ESTABLISHED
BECAUSE BETZLER TEACHES AWAY FROM THE CLAIMED INVENTION

Applicants respectfully submit that a *prima facie* case of obviousness has not been established because Betzler teaches away from the claimed invention.

As discussed above, Betzler teaches that a radiation measuring device includes criteria of small dimensions of the detector. In support of this objective, Betzler teaches that it is essential to design the bolometer detector structurally in such a way that the heat flow from the absorber side through the thin carrier foil to the resistor layer takes place in a much shorter time than the lateral dissipation of heat from the absorber layer to the dissipater. With a given thickness, a corresponding enlargement of the length and/or width results in an enlargement of the time constant. Conversely, with a given thickness, a corresponding decrease of the length and/or width results in a decrease of the time constant – which results in heat flow from the absorber side through the thin

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carrier foil to the resistor layer taking place in a much shorter time than the lateral dissipation of heat from the absorber layer to the dissipater.

Thus, Applicants respectfully submit that, by teaching to reduce the length and/or width of the detector in order to reduce the time constant of the detector, Betzler teaches away from "a temperature sensor attached over a substantial portion of the body in thermal communication with a substantial portion of the body, the temperature sensor being configured to detect a change in temperature of a substantial portion of the body responsive to absorption of the captured radiation" as recited in Claim 26, from which Claim 30 depends.

Therefore, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, and that Claim 30 is patentable over the combination of Betzler, Vogel, and Fricke and is in condition for allowance. Applicants respectfully request reconsideration and allowance of Claim 30.

CONCLUSION

In view of the above arguments, Applicants very respectfully submit that all claims pending in this application are in condition for allowance. Applicants very respectfully request reconsideration and allowance of claims 1-44 that are pending in this application.

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Respectfully submitted,

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